



Pressure

Differential pressure transmitter Model DPT-10

WIKA data sheet PE 86.21


 for further approvals see
 page Seite 10


Applications

- Process engineering
- Chemical industry
- Petrochemical industry
- Food and beverage industry
- Machine building and plant construction

Special features

- High measurement accuracy
- Freely scalable measuring ranges
- Various Ex approvals
- Seven different case variants
- Configuration via DTM (Device Type Manager) in accordance with the FDT (Field Device Tool) concept (e.g. PACTware)

Description

The DPT-10, with its 4 ... 20 mA, 4 ... 20 mA HART® or PROFIBUS® PA output signals, combined with the intrinsically safe or flameproof enclosure ignition protection type, is ideally suited for application in appropriate systems. The electronics of all of these transmitters, even for the flameproof variant, are intrinsically safe. Thus it is possible to make adjustments on the instrument in Ex areas while the instrument is live.

Versatile in application

The DTP-10 is suitable for many industrial measuring requirements, such as flow measurement using differential pressure transducers, level measurement or filter and pump monitoring. With mounted diaphragm seals, the DTP-10 is also suitable for harsh process conditions. As a result of the available measuring ranges from -10 ... +10 mbar [-0.15 ... +0.15 psi] to -40 ... +40 bar [-600 ... +600 psi] and a static pressure limitation of up to 420 bar [6,300 psi], the instrument can be used in almost any application. The internal digital signal processing, combined with proven sensors, guarantees high accuracy and the best long-term stability.



Differential pressure transmitter model DPT-10

There are seven different case variants available, and thus it is possible to select a variant suited to every operating environment. The case itself can be rotated through 330° and is available in plastic, aluminium and stainless steel. An electropolished stainless steel case (316L) is available to meet the high demands of the food and pharmaceutical industries.

Easy configuration and operation

Service and configuration at the instrument is carried out using the optional display and operating module, which can be fitted in four positions. The operating menu has a simple and self-explanatory structure and has nine selectable languages. Alternatively, the operating parameters can be set using the PACTware™ free and non-proprietary configuration software. An instrument-specific DTM enables easy integration into corresponding process control systems.

Specifications

Measuring ranges

Measuring ranges							
Measuring range ¹⁾	-10 mbar ... +10 mbar [-0.15 ... +0.15 psi]	-30 mbar ... +30 mbar [-0.45 ... +0.45 psi]	-100 mbar ... +100 mbar [-1.5 ... +1.5 psi]	-500 mbar ... +500 mbar [-7.5 ... +7.5 psi]	-3 bar ... +3 bar [-45 ... +45 psi]	-16 bar ... +16 bar [-240 ... +240 psi]	-40 bar ... +40 bar ²⁾ [-600 ... +600 psi]
Max. static operating pressure	160 bar [2,400 psi]			160 bar [2,400 psi] (option: 420 bar [6,300 psi])			
Smallest possible span	0.25 mbar [0.01 psi]	0.3 mbar [0.01 psi]	1 mbar [0.02 psi]	5 mbar [0.08 psi]	30 mbar [0.45 psi]	160 mbar [2.4 psi]	400 mbar [5.8 psi]
Lowest static pressure ³⁾	0.1 mbar abs. [0.001 psi], with application for oxygen the static pressure should not be lower than 10 mbar abs. [0.15 psi]						
Overload on one side	160 bar [2,400 psi]			160 bar [2,400 psi] (option: 420 bar [6,300 psi])			
Overload on both sides	240 bar [6,300 psi]			240 bar [6,300 psi] (option: 630 bar [9,100 psi])			

1) Other measuring ranges can be set via the respective turndown.

2) Measuring range 40 bar [600 psi], "..." side with one-sided overload safety up to 100 bar [1,500 psi].

3) Valid at reference conditions per IEC 62828.

Output signals

Output signals	
Output signal	4 ... 20 mA, 2-wire, (option: 4 ... 20 mA, 2-wire with superimposed communication signal HART [®] , PROFIBUS [®] PA)
Dead time	100 ms
Time constant (63 %)	180 ms (450 ms for measuring ranges 10 mbar and 30 mbar [0.15 and 0.45 psi])
Dampening	0 ... 999 s, adjustable
Permissible max. load	$R_A = (U_B - U_{Bmin})/0.023 \text{ A}$

Accuracy specifications

Accuracy specifications				
Measuring ranges	< 0.5 bar [7.5 psi]		≥ 0.5 bar [7.5 psi]	
Reference accuracy at room temperature ¹⁾	Measuring ranges 10 and 30 mbar [0.15 and 0.45 psi]	from TD 1:1 ±0.15 % of span x TD	■ to TD 15:1 ±0.075 % of span ■ TD from 15:1 ±(0.0015 x TD + 0.053) % of span	
	Measuring range 100 mbar [1.5 psi]	■ to TD 4:1 ±0.075 % of span ■ from TD 4:1 ±(0.012 x TD + 0.027) % of span		
Adjustability	-120 ... +120 % of the nominal pressure range (with -100 ... +100 mbar [-1.5 ... +1.5 psi] measuring range, 100 mbar [1.5 psi] is the nominal measuring range)			
Behaviour with TD	Measuring ranges 10 and 30 mbar [0.15 and 0.45 psi]	Measuring deviation = 0.09 % of span x TD	■ Measuring deviation = 0.075 % (with TD to 15:1) ■ Measuring deviation = 0.0015 % x TD + 0.053 % (from TD 15:1)	
	Measuring range 100 mbar [1.5 psi]	■ Measuring deviation = 0.075 % (with TD to 4:1) ■ Measuring deviation = 0.012 % x TD + 0.027 % (from TD 4:1)		
Long-term stability	±0.18 % URL/year		±0.05 % URL/year	
Total performance ^{2) 3)}	Measuring range 10 mbar [0.15 psi]	0.35 % (with max. TD 1:1)	0.15 % (with max. TD 2:1)	
	Measuring range 30 mbar [0.45 psi]	0.77 % (with max. TD 1:1)		
	Measuring range 100 mbar [1.5 psi]	0.27 % (with max. TD 2:1)		
Influence of the system pressure ³⁾				
Zero point	±0.35 % URL/70 bar		±0.075 % URL/70 bar	
	Measuring range 10 mbar [0.15 psi]	0.15 % URL/7 bar		
Span	±0.14 % URL/70 bar		±0.14 % URL/70 bar	
	Measuring range 10 mbar [0.15 psi]	0.035 % URL/7 bar		
Influence of the medium and ambient temperature ³⁾				
-10 ... +60 °C [14 ... 140 °F]	Measuring ranges 10 mbar and 30 mbar [0.15 psi and 0.45 psi]	±(0.31 x TD + 0.06) %	Measuring ranges 0.5 bar [7.5 psi], 3 bar [45 psi] and 40 bar [600 psi]	±(0.08 x TD + 0.05) %
	Measuring range 100 mbar [1.5 psi]	±(0.18 x TD + 0.06) %	1 measuring range 6 bar [240 psi]	±(0.1 x TD + 0.1) %
-40 ... -10 °C [-40 ... +14 °F] / 60 ... 85 °C [140 ... 185 °F]	Measuring ranges 10 mbar and 30 mbar [0.15 psi and 0.45 psi]	±(0.45 x TD + 0.1) %	Measuring range 0.5 bar [7.5 psi], measuring range 3 bar [45 psi]	±(0.12 x TD + 0.1) %
	Measuring range 100 mbar [1.5 psi]	±(0.3 x TD + 0.15) %	Measuring range 16 bar [240 psi]	±(0.15 x TD + 0.2) %
			Measuring range 40 bar [600 psi]	±(0.37 x TD + 0.1) %
Mounting position influence ⁴⁾	≤ 4 mbar [0.06 psi]			
Thermal change	Change of the current output with 4 ... 20 mA signals: 0.05 % per 10 K based on 20 °C [68 °F] (maximum 0.15 % at set span)			

1) Includes non-linearity following terminal method, hysteresis and non-repeatability in accordance with IEC 62828.

2) Includes non-linearity, hysteresis, non-repeatability, thermal change of zero point and static pressure influence (Pstat= 70 bar) in the temperature range -10 ... +60 °C [14 ... 140 °F].

3) Values are not valid for tantalum diaphragm.

4) Maximum value with process module in horizontal position. Specifications valid for basic version without diaphragm seal. For instruments with inert oil, the value doubles.

URL = basic measuring range

TD = turndown; turndown = basic measuring range : scaled measuring range

Reference conditions (per IEC 61298-1)

Reference conditions (per IEC 61298-1)	
Temperature	+18 ... +30 °C [64 ... 86 °F]
Atmospheric pressure	860 ... 1,060 mbar [86 ... 106 kPa, 12.5 ... 15.4 psig]
Air humidity	45 ... 75 % r. h.
Characteristic curve determination	Terminal method per IEC 61298-2
Curve characteristics	Linear
Reference mounting position	Vertical, i.e. vertical process assembly (connections are on the side)

Voltage supply

Supply voltage (non-Ex)

Signal type	Backlighting	
	Inactive	Active
4 ... 20 mA	DC 12 ... 36 V	DC 20 ... 36 V
4 ... 20 mA with a superimposed HART® communication signal	DC 9.6 ... 35 V	DC 16 ... 35 V
PROFIBUS® PA	DC 9 ... 32 V	DC 18 ... 32 V

Supply voltage (Ex ia)

Signal type	Backlighting	
	Inactive	Active
4 ... 20 mA	DC 12 ... 30 V	DC 20 ... 30 V
4 ... 20 mA with a superimposed HART® communication signal	DC 12 ... 30 V	DC 20 ... 30 V
PROFIBUS® PA	DC 9 ... 24 V	DC 18 ... 24 V

Supply voltage (Ex d ia)

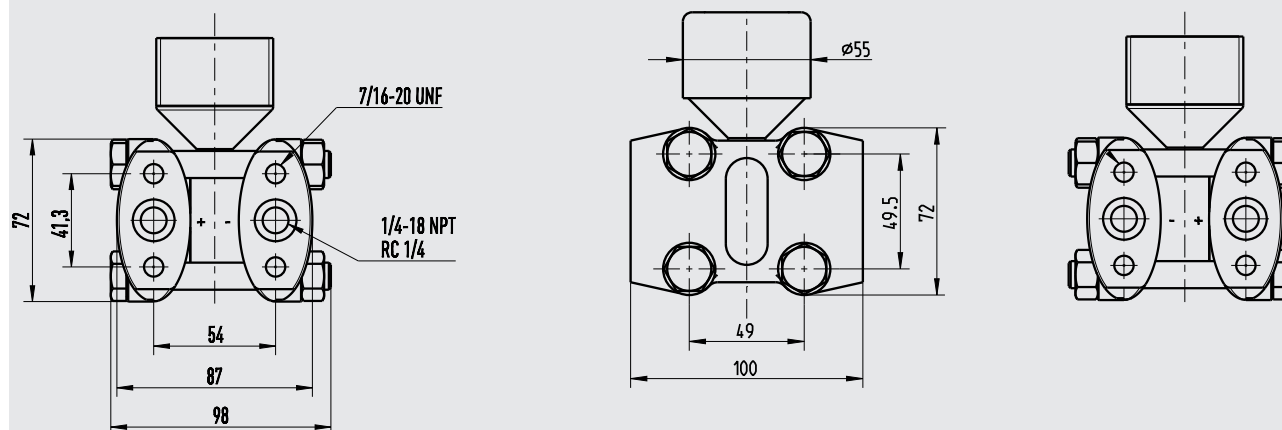
Signal type	
4 ... 20 mA	DC 15 ... 35 V
4 ... 20 mA with a superimposed HART® communication signal	DC 15 ... 35 V
PROFIBUS® PA	DC 16 ... 32 V

Backlighting is not possible with this approval, due to the integrated barrier.

Process connections

Oval flange, connection 1/4-18 NPT or RC 1/4 with rear venting

Measuring ranges ≥ 100 mbar [1.5 psi]

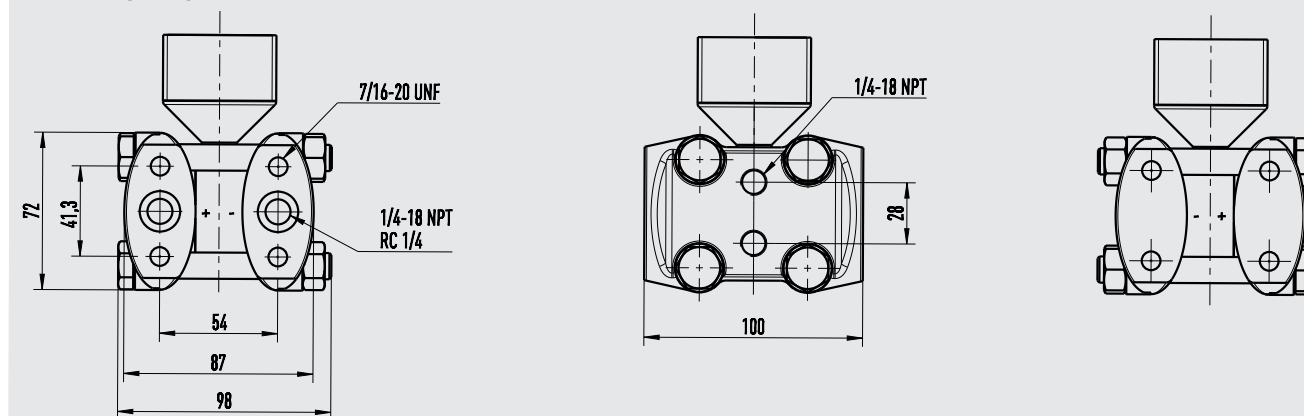


Connection	Mounting	Material	Equipment
1/4-18 NPT IEC 61518	7/16-20 UNF	AISI 316L	2 vent valves ¹⁾
1/4-18 NPT IEC 61518	7/16-20 UNF	Hastelloy C276	Without valves/plugs
RC 1/4	7/16-20 UNF	AISI 316L	2 vent valves ¹⁾
1/4-18 NPT IEC 61518	PN 160: M10; PN 420: M12	AISI 316L	2 vent valves ¹⁾
1/4-18 NPT IEC 61518	PN 160: M10; PN 420: M12	Hastelloy C276	Without valves/plugs

1) Material: AISI 316L/1.4404

Oval flange, connection 1/4-18 NPT or RC 1/4, with lateral venting

Measuring ranges ≥ 100 mbar [1.5 psi]



Connection	Mounting	Material	Equipment
1/4-18 NPT IEC 61518	7/16-20 UNF	AISI 316L	2 vent valves, 4 plug screws ¹⁾
1/4-18 NPT IEC 61518	7/16-20 UNF	Hastelloy C276	Without valves/plugs
RC 1/4	7/16-20 UNF	AISI 316L	2 vent valves, 4 plug screws ¹⁾

1) Material: AISI 316L/1.4404

For measuring systems with the diaphragm seal diaphragms mounted either directly or via capillaries, WIKA uses special process connections, that offer higher performance with optimised volume.

Materials

Material	
Wetted parts	
Process connection	316L (option: Hastelloy C276)
Diaphragm	316L (option: Hastelloy C276, tantalum, Hastelloy C276, gold-rhodium-plated, Monel 400)
Sealing	FKM (option: NBR, PTFE, copper)
Internal transmission fluid ¹⁾	Silicone oil (halocarbon oil for oxygen applications)
Weight	approx. 4.2 ... 4.5 kg [9.26 ... 9.92 lbs] depending on the process connection and case version

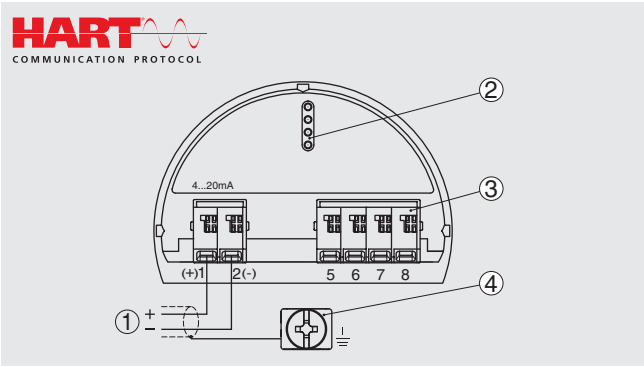
1) With application for oxygen or when using halocarbon oil, the static pressure should not be lower than 10 mbar abs [0.15 psi]

Case	Material
Single chamber case, plastic	PBT, polyester
Single chamber case, aluminium	Die-casting AlSi10Mg, powder-coated on PE basis
Single chamber case, cast stainless steel	Stainless steel 316L
Single chamber case, electropolished stainless steel, deep-drawn	Stainless steel 316L
Double chamber case, plastic	PBT, polyester
Double chamber case, aluminium	Die-casting AlSi10Mg, powder-coated on PE basis
Double chamber case, cast stainless steel	Stainless steel 316L

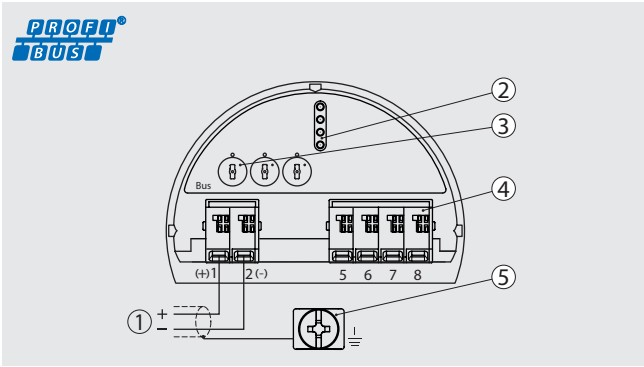
Electrical connection

Electrical connection		
Spring-loaded terminals	Wire cross-section	<ul style="list-style-type: none"> Wire or strand: 0.2 ... 2.5 mm² (AWG 24 ... 14) Strand with end splice: 0.2 ... 1.5 mm² (AWG 24 ... 16)
Cable glands M20 x 1.5		
Plastic, PA	Sealing	NBR
	Cable diameter	<ul style="list-style-type: none"> 5 ... 9 mm [0.2 ... 0.35 in] 6 ... 12 mm [0.24 ... 0.47 in] 10 ... 14 mm [0.39 ... 0.55 in]
Brass, nickel-plated	Sealing	NBR
	Cable diameter	9 ... 13 mm [0.35 x 0.51 in] (for armoured cable)
Stainless steel	Sealing	NBR
	Cable diameter	7 ... 12 mm [0.28 x 0.47 in]
Cable glands ½ NPT		
sealed with blind plug		
Plastic, PA	Cable diameter	5 ... 9 mm [0.2 x 0.35 in]
Brass, nickel-plated	Cable diameter	6 ... 12 mm [0.24 x 0.47 in]
Brass, nickel-plated	Cable diameter	9 ... 13 mm [0.35 x 0.51 in] (for armoured cable)
Electrical safety	Reverse polarity protection	

Connection compartment for single chamber case

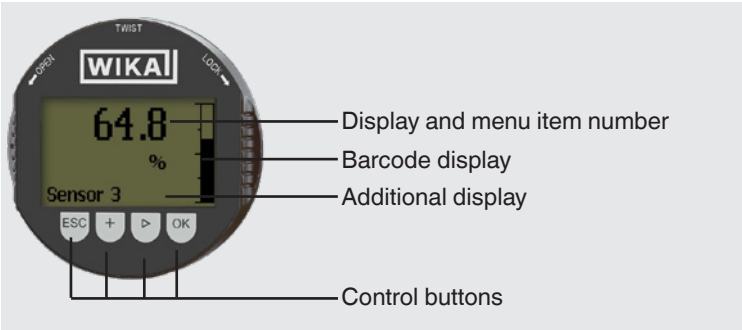


4 ... 20 mA / HART®	
①	Voltage supply / signal output
②	Interface of digital display
③	Connection terminals for external display and operating unit
④	Ground terminal for cable shield



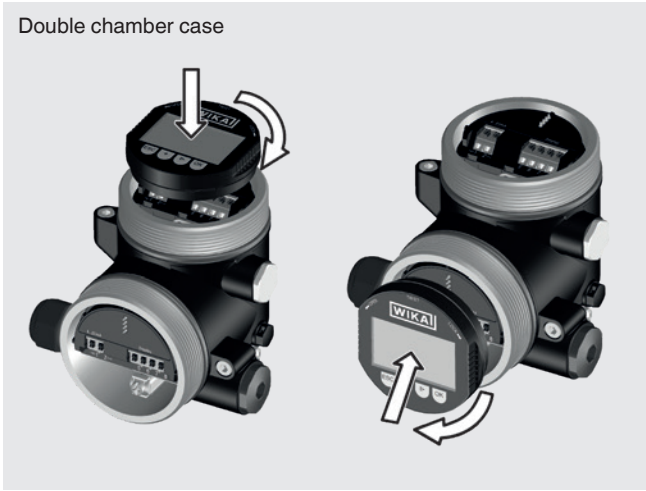
PROFIBUS® PA	
①	Voltage supply / signal output
②	Interface of digital display
③	For PROFIBUS® PA: Adjustment of the Profibus settings via 3 switches
④	Connection terminals for external display and operating unit
⑤	Ground terminal for cable shield

Display and operating unit (option)



Specifications				
Backlighting	Yes			
Background	Grey, black digits			
Upgradable	Yes (for order numbers, see “Accessories”)			
Menu languages	German English French Spanish	Polish Italian Dutch Japanese	Chinese Russian Portuguese Czech	Turkish
Display size	5-digit measured value display, adjustable (option: bar graph display) Max. 5 digits, size 7 x 13 mm [0.28 x 0.51 in]			
Ingress protection per IEC/EN 60529	IP20 (loose) IP40 (built-in without cover)			
Material	Case from ABS, window from polyester film			

Mounting positions













Operating conditions

Operating conditions		
Permissible temperature ranges		
Ambient	■ -40 ... +80 °C [-40 ... +176 °F] (without display) ■ -20 ... +70 °C [-4 ... +158 °F] (with display)	
Storage and transport	-40 ... +80 °C [-40 ... +176 °F]	
Restrictions to medium temperature due to sealing material		
FKM/NBR	-20 ... +85 °C [-4 ... +185 °F]	
PTFE, copper	-40 ... +85 °C [-40 ... +185 °F]	
FKM, oil and grease free	-10 ... +85 °C [14 ... 185 °F]	
For oxygen applications (max. static pressure: 160 bar [2,400 psi])	Copper, PTFE	-20 ... +60 °C [-4 ... +140 °F]
	FKM	-10 ... +60 °C [14 ... 140 °F]
Temperature limits	With differential pressure lines longer than 100 mm [3.94 in]: -40 ... +120 °C [-40 ... 248 °F]	
Vibration resistance ¹⁾	4 g (5 ... 100 Hz)	
Shock resistance	100 g per IEC 60068-2-27 (mechanical shock)	
Instrument safety		
Ingress protection per IEC/EN 60529	IP66/67 (standard case)	
Electrical safety	Overvoltage category III, protection class II	

1) Tested in accordance with the directive GL, characteristic curve 2 (not for double chamber cases from stainless steel)

Approvals (option)

Logo	Description	Country
	EU declaration of conformity	European Union
	EMC directive, interference emission (group 1, class B) and immunity per EN 61326-1:2013 (industrial application), EN 61326-2-3:2013 ¹⁾	
	Pressure equipment directive	
	RoHS directive	
	ATEX directive - Ex i Zone 0 gas II 1G Ex ia IIC T6...T1 Ga Zone 1 mounting to zone 0 gas II 1/2G Ex ia IIC T6...T1 Ga/Gb Zone 1 gas II 2G Ex ia IIC T6...T1 Gb - Ex d Zone 1 mounting to zone 0 gas II 1/2G Ex db ia IIC T6 Ga/Gb Zone 1 gas II 2G Ex db ia IIC T6 Gb	
	IECEx Hazardous areas - Ex i Zone 0 gas Ex ia IIC T6...T1 Ga Zone 1 mounting to zone 0 gas Ex ia IIC T6...T1 Ga/Gb Zone 1 gas Ex ia IIC T6...T1 Gb - Ex d Zone 1 mounting to zone 0 Gas Ex db ia IIC T6 Ga/Gb Zone 1 gas Ex db ia IIC T6 Gb	International
	EAC ■ Pressure equipment directive ■ Electromagnetic compatibility ■ Hazardous areas - Ex i Zone 0 gas 0 Ex ia IIC T6...T1 X Zone 1 gas 1 Ex ia IIC T6...T1 X - Ex d Zone 1 gas 1 Ex d IIC T6...T1 X	Eurasian Economic Community
	GOST Metrology, measurement technology	Russia
	KazInMetr Metrology, measurement technology	Kazakhstan
-	MTSCHS Permission for commissioning	Kazakhstan
	BelGIM Metrology, measurement technology	Belarus
	UkrSEPRO Metrology, measurement technology	Ukraine
	DNOP_MakNII ■ Mining ■ Hazardous areas - Ex i Zone 0 gas II 1G II 1/2G II 2 G Ex ia IIC T6...T1	Ukraine
	Uzstandard Metrology, measurement technology	Uzbekistan

1) With electrostatic discharge, a short-term, increased error of up to 1 % of the nominal measuring range can occur. This also applies to NAMUR NE21.

Manufacturer's information and certificates

NAMUR recommendations

NAMUR is the automation technology interest group for the process industry in Germany. The published NAMUR recommendations are considered standards in field instrumentation, and also have the character of international standards.

The instrument fulfils the requirements of the following NAMUR recommendations:

- NE21 - Electromagnetic compatibility of equipment
- NE43 - Signal level for failure information for transmitters
- NE53 - Compatibility of field instruments and display and operating components

For further information, see www.namur.net/en

NACE

NACE is a term for an organisation (National Association of Corrosion Engineers) concerned with the topic of corrosion. The results of this organisation are published as NACE standards and regularly updated.

The instruments and, in particular, the weld seams fulfil:

- NACE MR0175 - Oil extraction and processing

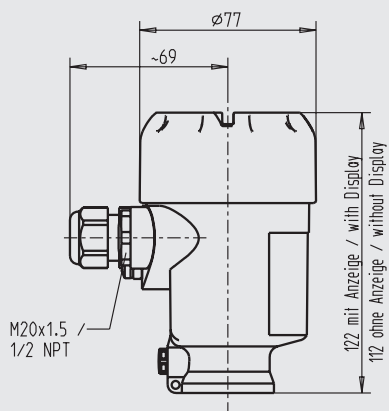
Certificates (option)

- Test certificate for the measurement accuracy included in delivery (5 measuring points in the nominal measuring range)
- 2.2 test report
- 3.1 inspection certificate
- DKD/DAkkS calibration per IEC 17025

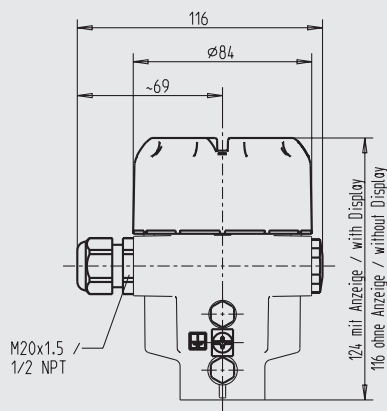
→ Approvals and certificates, see website

Case variants

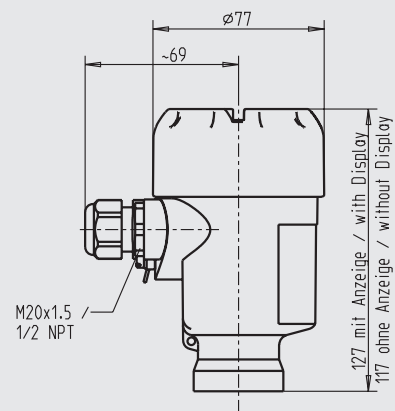
Single chamber case, plastic



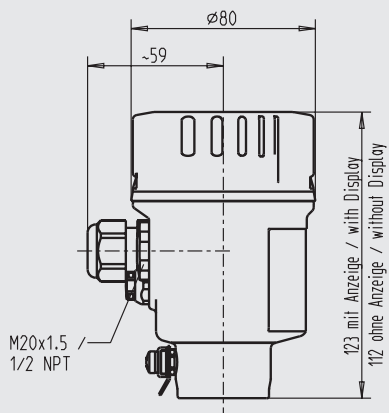
Single chamber case, aluminium



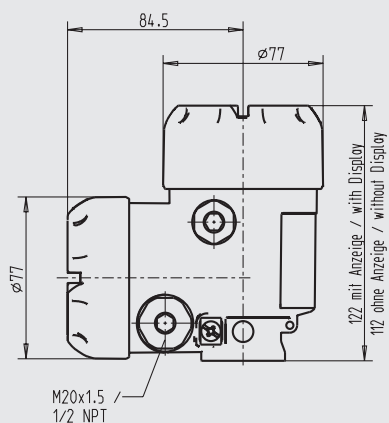
Single chamber case, cast stainless steel



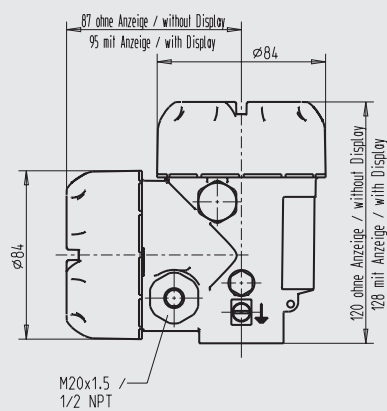
Single chamber case, deep-drawn stainless steel



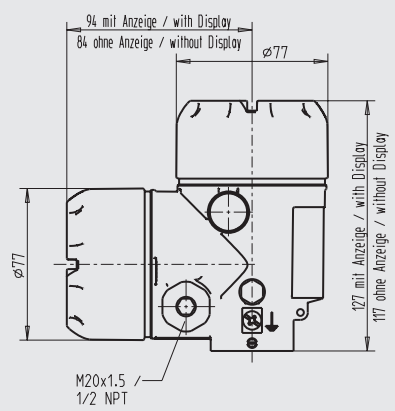
Double chamber case, plastic



Double chamber case, aluminium

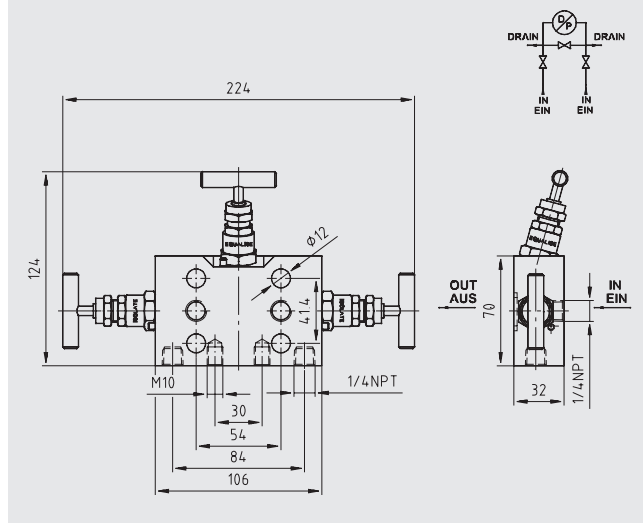


Double chamber case, cast stainless steel



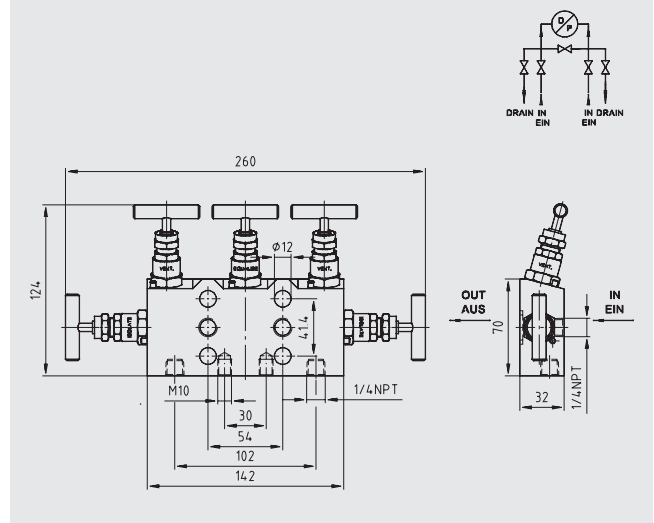
Mounting variants

3-valve manifolds



With upstream pressure compensating valves it is possible to avoid one-sided overpressure loading during both start-up and operation, and also to enable zero point checks during operation. Furthermore, they enable the isolation of the process lines without interference to the running process.

5-valve manifolds



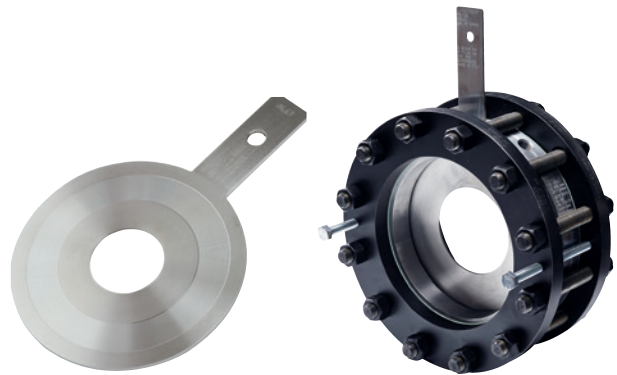
Furthermore, these pressure compensating valves (with integrated shut-off, purge and vent valves) enable the pressure gauge to be vented on one or both sides and the supply line to be purged.

Diaphragm seal



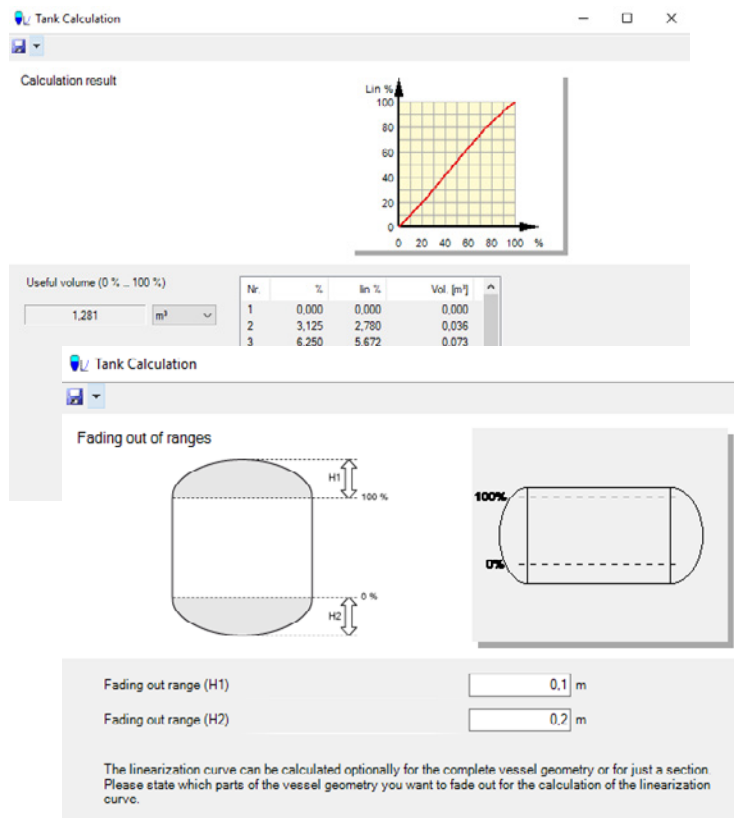
By using diaphragm seals, it is possible to adapt the model DPT-10 differential pressure transmitter to even the most difficult of conditions in the process industry. The transmitters can thus be used at extreme temperatures, and with aggressive, corrosive, heterogeneous, abrasive, highly viscous or toxic media. As a result of the wide variety of aseptic connections, such as clamp, threaded pipe or DIN 11864 aseptic connections, measuring assemblies meet the high demands of sterile process engineering.

Primary flow elements



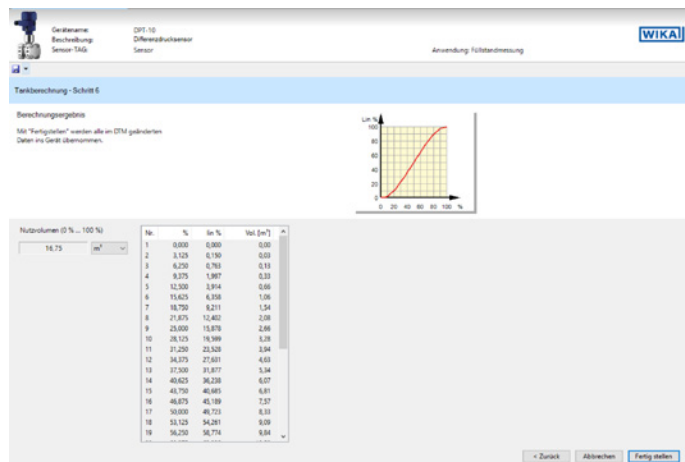
Primary flow elements for flow measurement are available as accessories. Depending on the application, the differential pressure transducers are designed as simple orifice plates, orifice flanges or complete meter runs.

User interface DTM



For HART® and PROFIBUS® PA output signals, a DTM is available in accordance with the FDT standard. The DTM provides a self-explanatory and clear user interface for all setup and control processes of the transmitter. For testing purposes, it is also possible to simulate process values and archive the parameter data.

Recording of the measured values is available for diagnostic purposes.



Tank volume calculation

The additional tank volume calculation of the DTM function can be used to reproduce any optional tank geometry. The corresponding linearisation table is generated automatically. The linearisation table can be transferred directly to the transmitter.

Accessories

Description		Order number
	Display module, model DIH52-F 5-digit display, 20-segment bar graph, without separate power supply, with additional HART® functionality. Automatic adjustment of measuring range and span. Secondary-master functionality: Setting the measuring range and unit of the connected transmitter using HART® standard commands possible. Optional: Explosion protection per ATEX	on request
	HART® modem for USB interface, specifically designed for use with notebooks (model 010031)	11025166
	HART® modem for RS-232 interface (model 010001)	7957522
	HART® modem for Bluetooth interface Ex ia IIC (model 010041)	11364254
	PowerXpress HART® modem, with optional power supply (model 010031P)	14133234
	3-valve manifold, form A, ½ NPT female (IEC 61518-A) Stainless steel, PN 420, form A, NACE compliant, 3.1 material certificate	13382498
	3-valve manifold, form A, ¼ NPT female (IEC 61518-A) Stainless steel, PN 420, form A, NACE compliant, 3.1 material certificate	13382510
	5-valve manifold, form A, ½ NPT female (IEC 61518-A) Stainless steel, PN 420, form A, NACE compliant, 3.1 material certificate	13382552
	5-valve manifold, form A, ¼ NPT female (IEC 61518-A) Stainless steel, PN 420, form A, NACE compliant, 3.1 material certificate	13382561
	Oval flange, ¼ NPT, stainless steel (2 pieces) Stainless steel, PN 420, form A, NACE compliant, 3.1 material certificate	13382609
	Oval flange, ½ NPT, stainless steel (2 pieces) Stainless steel, PN 420, form A, NACE compliant, 3.1 material certificate	13382595
	Set of sealing plugs, ¼ NPT, 316L (2 pieces) for the vents at the differential pressure sensor Included in delivery with lateral venting, except for process connection from Hastelloy	14035620
	Set of vent valves, ¼ NPT, 316L (2 pieces) for the vents at the differential pressure sensor Included in delivery, except for process connection from Hastelloy	14368975
	Instrument mounting bracket for wall or pipe mounting with mounting bracket and screws, stainless steel	11553945
	Overvoltage protection for transmitters, 4 ... 20 mA, M20 x 1.5, series connection	14002489
	for transmitters, PROFIBUS® PA, M20 x 1.5, series connection	14013659
	Model DI-PT-R display and operating module, case cover aluminium with window	12298884
	Model DI-PT-R display and operating module, case cover electropolished cast stainless steel with safety window	13315269
	Model DI-PT-R display and operating module, case cover plastic with window	13315277
	Model DI-PT-R display and operating module, case cover cast stainless steel with window for single chamber case	12298906
	Model DI-PT-R display and operating module, case cover cast stainless steel with window for double chamber case	14045598
	Model DI-PT-E external display and operating module, aluminium case	12354954
	Model DI-PT-E external display and operating module, cast stainless steel case	12355101
	Model DI-PT-E external display and operating module, plastic case	14134247



Ordering information

Approval / Output signal / Static pressure / Differential pressure measuring range / Process connection / Sealing / Process temperature / Case / Electrical connection / Display / Mounting / Additional equipment / Certificates / Configuration

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